



# Federal and International Coordination of Climate Policies: *US Climate Clubs*

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Resources for the Future

Paris 2015 and Beyond, Cooling the Climate Debate

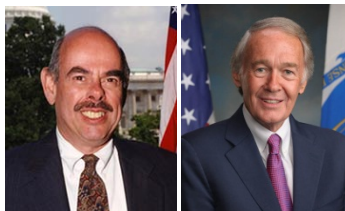
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**RESOURCES**  
FOR THE FUTURE

# Timeline of US GHG Regulation



Waxman-Markey passed in the US House of Representatives



Obama's Climate Action Plan foreshadows EPA's Clean Power Plan for existing power plants.



Final Clean Power Plan; Proposed Model Rules for States

2007

Jun 2009

Jul 2010

Jan 2011

Jun 2013

Jun 2014

Aug 2015

Supreme Court affirmed in *Massachusetts v. EPA* that greenhouse gases are covered by the Clean Air Act definition of air pollutant

Senate failed to take up WM climate bill



Cap and trade was declared dead

EPA issues new standards for motor vehicles and pre-construction permitting

EPA Proposed Clean Power Plan under the Clean Air Act 111(d)



# The Proximate Mirror

Change in US Policy from national cap and trade mirrors shifts seen in international climate negotiations.

- Move from top-down to bottom-up
- Countries publicly propose intended nationally determined contributions (INDCs) and specific measures for achieving them
- New hope for an agreement internationally
- Can this approach work within the US electric sector?

# Background on the Clean Power Plan

## ➤ Policy is implemented by the States

- EPA's technical findings determine state requirements and identifies best *system* of emissions reductions (BSER).
- State declaration of intent in 2016; final plans due in 2018
- Compliance in 2022

## ➤ Multiple pathways for States

- States choose rate-based, mass-based policies or other
- State plans must show environmental equivalence to BSER
- Coordination and strategic issues are challenging

## ➤ States encouraged to work together

- EPA proposed “trade ready” model plans for rate and mass

# Three Approaches Available for States

## Emissions **Rate** Standard (Carbon Intensity Standard)

- Tons/MWh

## Emissions **Mass** Standard (Cap)

- Tons
  - Note that with a forecast of generation (**MWh**) one can go back and forth between rate and mass...

$$(\text{Tons/MWh}) * \text{MWh} = \text{Tons}$$

## **Technology** Measures

- Must achieve equivalent mass standard (tons)

# Economic Advice

1. A mass-based standard provides a potential pathway to comprehensive carbon pricing, with a uniform economy-wide price.
  - Other sectors *will* be regulated, potentially calibrated to social cost of carbon. Or through legislation.
  - A rate-based standard is a dead end.
2. And, first best approaches (auctions, taxes) are possible under the Clean Power Plan and could evolve under a mass-based standard.

But observers have suggested there may be a strategic advantage for a state to choose a rate-based approach

- Rate approach does not cap emissions
  - Rate approach may have advantage in multi-state power markets
- Emissions leakage may result between rate and mass, which some observers characterize as a major problem

# Why States May Coalesce Around a Mass Based Approach!

## One consideration favors a rate-based approach

- Mass is perceived to “limit growth”
  - Strategic issues are not part of state conversations to date. Fairness issues are!

## Several favor a mass-based approach

- Mass goals set by EPA for existing sources are not difficult
- State plans are written by air quality agencies that have experience with mass standards
- Rate approach has various types of uncertainties with possibilities for strategic behavior
- Power markets view mass as simpler to manage
- Understanding emissions rate trading is difficult for regulators and their staff

# Trading

## Rate standard trading “emissions reduction credits” (MWhs)

- National rate targets subcategorized by fuel for existing sources
  - Coal 1,305 pounds CO<sub>2</sub> per MWh
  - Natural gas 771 pounds CO<sub>2</sub> per MWh
  - Renewable Energy and Energy Efficiency given credit (MWh)
  - Additional incentive (9%) for utilization of existing gas to avoid new gas
- Facilities can trade MWhs across fuels.
- Facilities can trade MWhs with other rate-based states

## Mass standard trading “emissions allowances” (tons)

- States are given a cap for existing sources, and additional emissions allowances if they include new sources
- If states do not cover new sources they must have **renewable set aside** and **updating output based allocation** to existing gas
- Facilities can trade tons with any other mass state



# The major concern –leakage of generation and emissions

1) Leakage among states may occur if incentives differ

❖ **Rate** approach implicitly provides a production incentive in the assignment of ERC credits (MWhs)

❖ **Mass** approach explicitly leaves the distribution of allowances (tons) up to the state

➤ We show states can mimic the production incentive of an emissions rate target under a mass-based program with targeted updating output-based allocation

➤ Leakage among states can be mitigated or reversed -- negative leakage could result (*A Proximate Mirror* 2015)

# A second type of leakage

## 2) Leakage to uncovered new sources may occur

### ❖ EPA cannot require states to cover new sources

- The additional allowances for states that include new sources is small
- States might want to exclude new natural gas sources to allow *growth*, causing leakage to these new uncovered sources.
- Updating output-based allocation to existing natural gas and new renewables can mitigate leakage to new sources
- EPA has adopted this updating output-based allocation approach in their proposed federal implementation plan and model rule for states

# Offering a Production Incentive with Allocation

Generator Type		Rate (existing sources)	Mass (existing sources) With Auction or Grandfathering	Mass (existing sources) With Example Updating OBA
Fossil	Coal	X		
	Existing Gas/Oil	X		X
	New Gas		implicit	implicit
Renewables	Existing			
	New	X		X
Nuclear	Existing			
	New	X		X
Hydro				
End Use Efficiency		X		

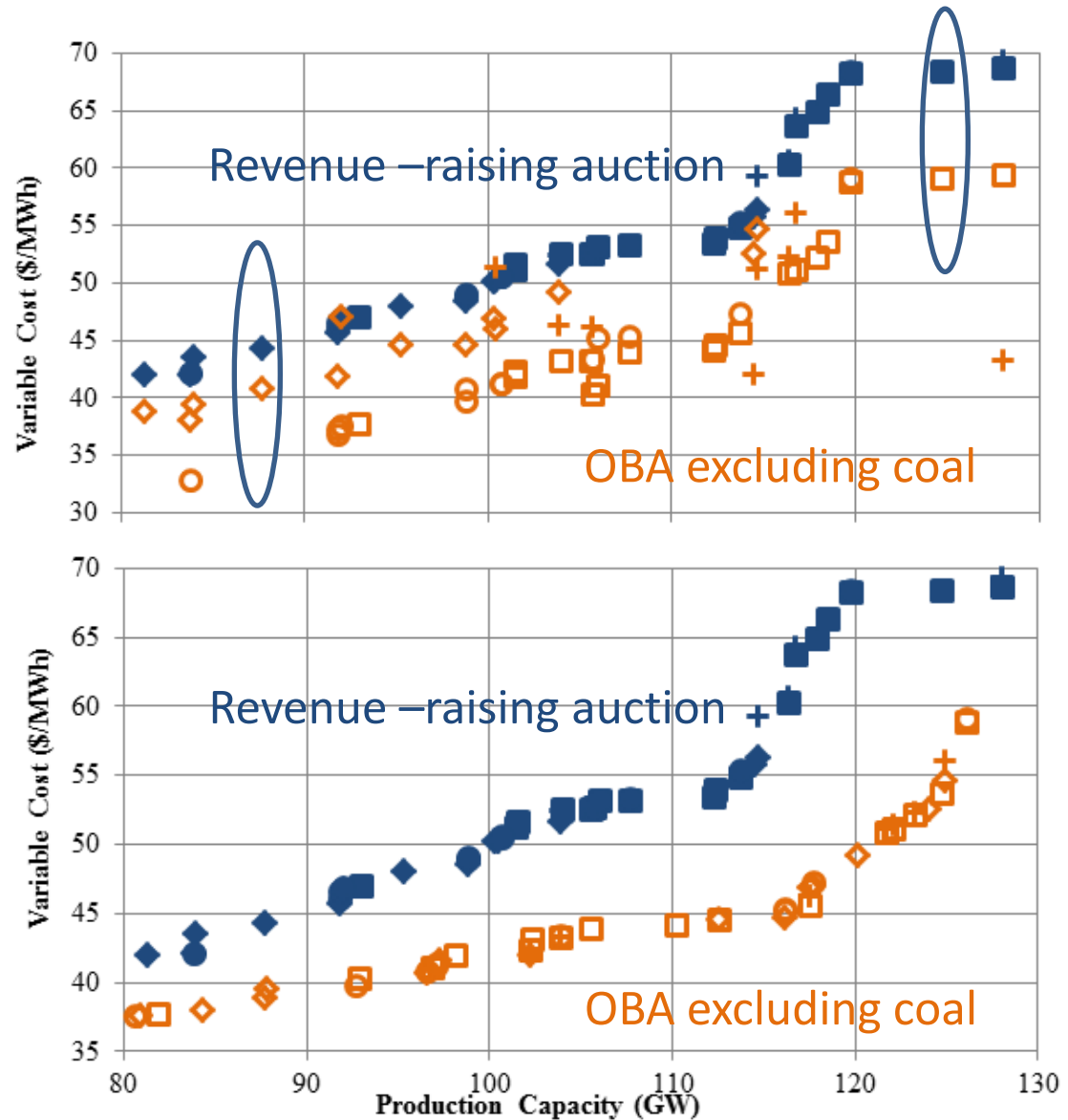
- Production incentives under mass-based system can solve both types of leakage: to rate-based states and to new gas units

# Production incentive affects the merit order dispatch

Revenue-raising auction compared with updating OBA-excluding coal

Before reordering

After reordering different technologies are pulled into service

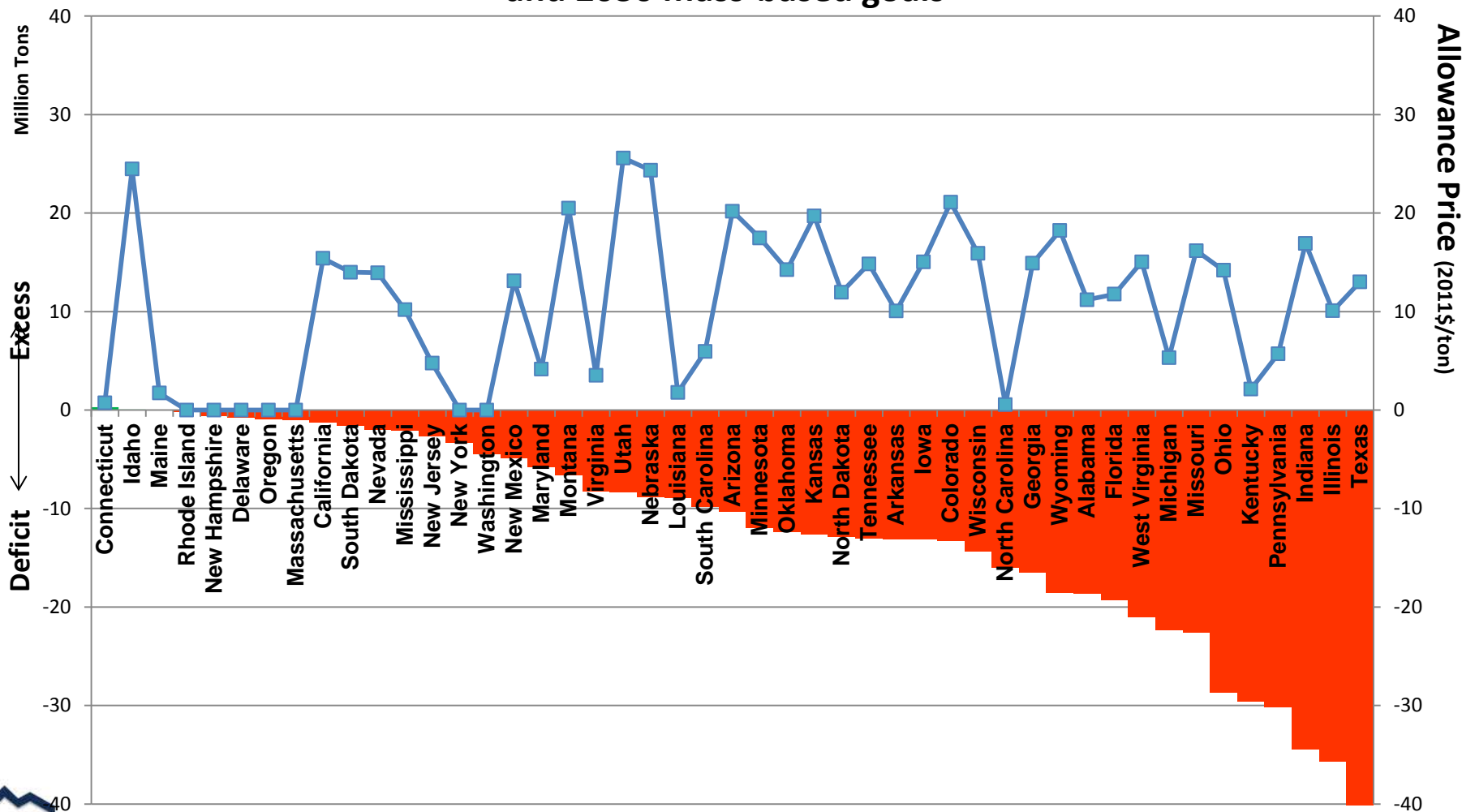


# A Comprehensive Cap Solves Both Leakage Problems

- States have different initial positions
- *Leadership states* have taken prior independently determined actions to reduce their emissions
  - Over half the states have renewable and efficiency support policies
  - Ten states have emissions caps in electricity sector
  - Many of these states will have surpluses under a mass-based approach

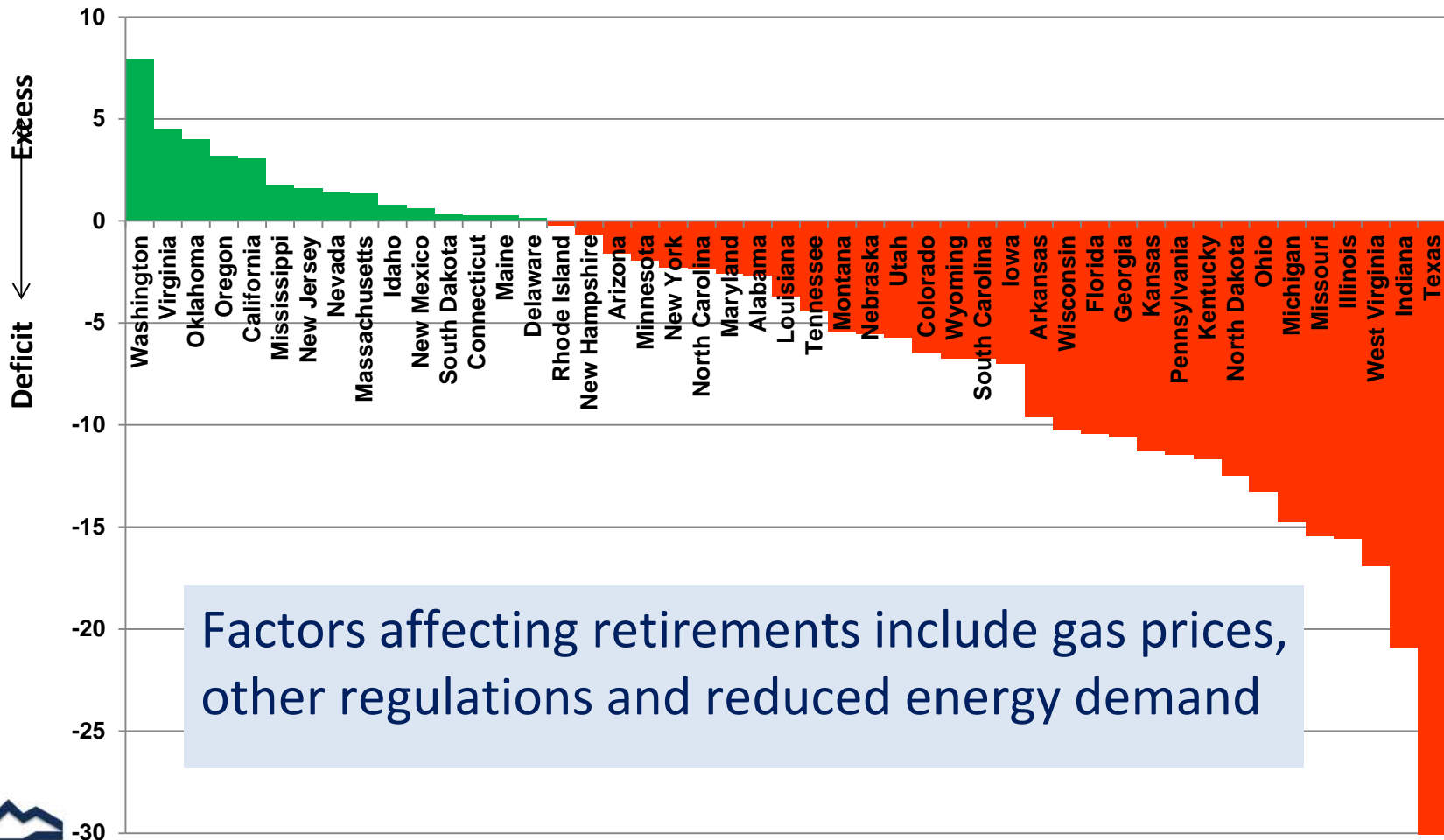
# State Compliance Gap of Existing Clean Power Plan Covered Sources with no Retirement, and State Allowance Prices

## Comparison of 2012 emissions from covered sources and 2030 mass-based goals



# State Compliance Gap with Known Retirements

## Compliance Gap of Existing Clean Power Plan Covered Sources with Known Retirement (Million Tons)



Factors affecting retirements include gas prices, other regulations and reduced energy demand

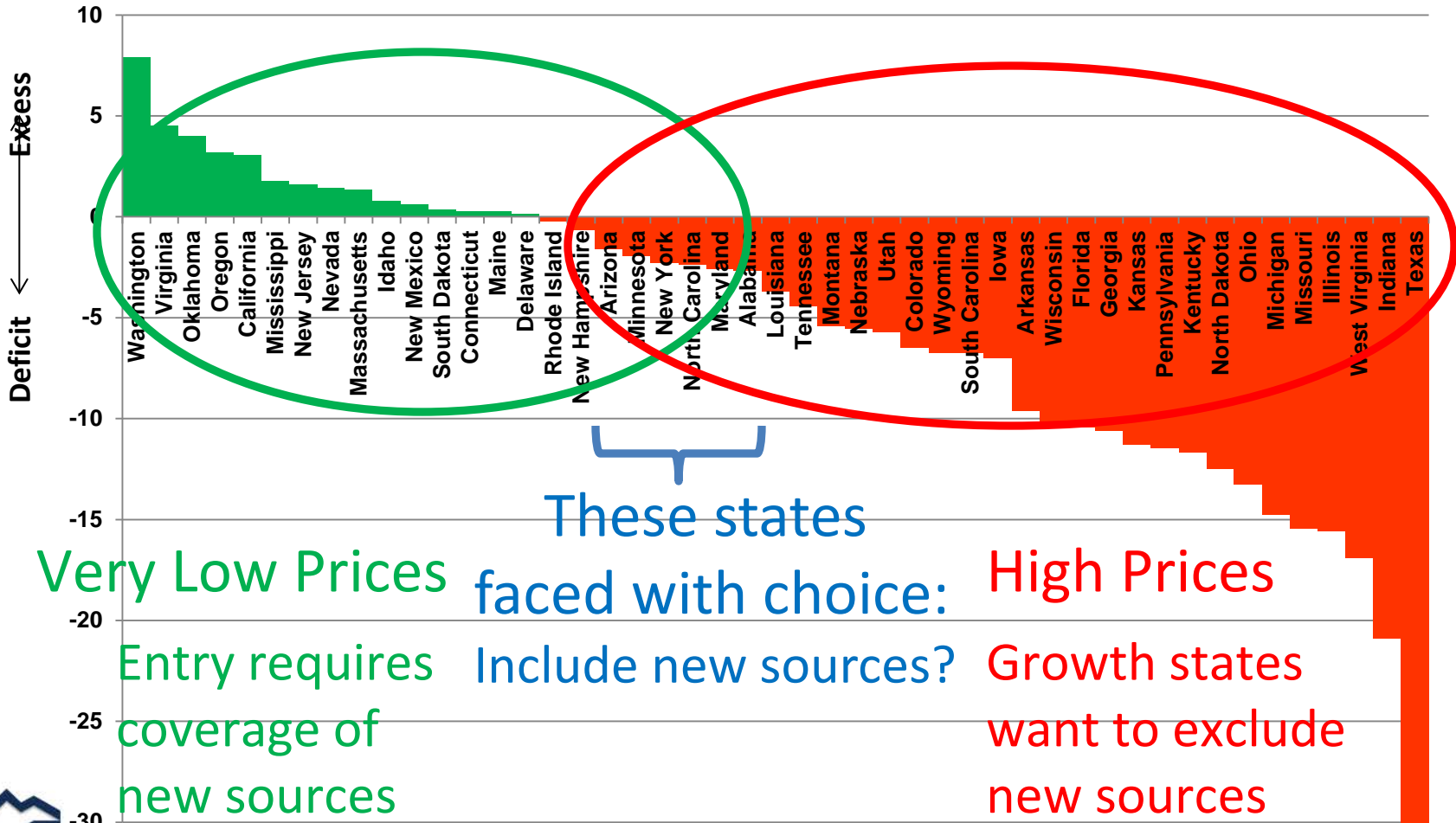
# Leadership States May Exercise Stackelberg Leadership in their Program Design

- Several western and northeast states have surplus
- States with surplus are debating whether to sell at all
  - Sale constitutes 100% leakage from previous state-level efforts
  - Sale yields revenues, but to whom?
- Or, states may sell only to those states that cover new sources, enforcing a US climate club
  - Cheap allowances may influence decision of other states



# Which Club to Join?

## Compliance Gap of Existing Clean Power Plan Covered Sources with Known Retirement (Million Tons)



# Climate Club Could Become the Dominant Regime

## Compliance Gap of Existing Clean Power Plan Covered Sources with Known Retirement (Million Tons)



Is there a pooling equilibrium?

# Climate Clubs are Also Forming through Linked Activities

## Linked policy developments in power markets

- Power markets may enforce uniformity in state plans
- New York's *Reforming the Energy Vision* Initiative may restructure the electricity sector
- Minnesota, many other states promoting nonemitting resources
- California's new renewable target is 50% by 2030
  - Its climate goals require expansion of the electricity sector
  - California legislation is opening up electricity market and investment opportunities to all western states

# Conclusions

1. Different goals and state policy flexibility in CPP invite strategic behavior and policy interaction could increase emissions and degrade air quality.
2. Updating output based allocation under a mass-based policy and leadership in program design could help to promote more efficient and effective policy through climate clubs.



Thank you!